



## SEQUENCE LISTING

<110> FULTON, CHANDLER  
LAI, ELAINE Y.

<120> THIAMINASES AND THIAMINASE GENES FOR USE IN APOPTOTIC  
THERAPIES

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<140> 09/675,509

<141> 2000-09-29

<150> 60/052,377

<151> 1997-07-11

<150> 60/087,526

<151> 1998-06-01

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<170> PatentIn Ver. 2.1

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Glu Phe Asp Cys Tyr Ser Asp Ala Ser Leu Gln Ser Leu Pro Asp Val
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Pro Tyr Val Tyr Thr Asp Val Leu Ala Leu Asn Ser Asn Leu Cys Asp	
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&lt;212&gt; PRT

&lt;213&gt; Naegleria gruberi

&lt;400&gt; 4

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 225 230 235 240  
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 245 250 255  
 Pro Tyr Val Tyr Thr Asp Val Leu Ala Leu Asn Ser Asn Leu Cys Asp  
 260 265 270  
 Glu Lys Gln Lys Val Ala Val Glu Val Ile Lys Asn Leu Leu Thr Asn  
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 Thr Leu Val Leu Asp Leu Leu Gly Leu Gly Leu Thr Leu Pro Ala Asn  
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 Lys Asn Gly Ile Ala His Leu Ala Lys Ser Ser Asn Phe Tyr Ala Gln  
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Ala Leu Ser Arg Gln Asn Leu Pro Gln Leu Glu Gly Ser Ser Ile Glu  
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Ala Lys Thr Leu Ala Ala Lys Asn Ile Lys Ala Arg Val Val Ser Leu  
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405 410

&lt;210&gt; 6

&lt;211&gt; 398

&lt;212&gt; PRT

&lt;213&gt; Craterostigma plantagineum

&lt;400&gt; 6

Pro Lys Glu Ala Glu Ala Thr Arg Lys Asn Leu Gly Trp Pro Tyr Glu  
1 5 10 15

Pro Phe His Val Pro Asp Asp Val Lys Lys His Trp Ser Arg His Ile  
20 25 30

Ala Glu Gly Ala Ala Leu Glu Ser Ala Trp Asn Ala Lys Phe Ala Glu  
35 40 45

Phe Gln Lys Lys Phe Pro Glu Glu Ala Ala Asp Leu Lys Ser Ile Ile  
50 55 60

Thr Gly Glu Leu Pro Thr Asn Trp Glu Ser Ile Phe Pro Thr Tyr Thr  
65 70 75 80

Pro Glu Asn Pro Gly Leu Pro Thr Arg Thr Leu Ser His Gln Ile Leu  
85 90 95

Asn	Gly	Leu	Gly	Asp	Val	Leu	Pro	Gly	Leu	Leu	Gly	Gly	Ser	Ala	Asp		
			100					105					110				
Leu	Thr	Leu	Ser	Asn	Met	Ala	Phe	Leu	Lys	Asn	Ser	Gly	Asp	Phe	Gln		
		115					120					125					
Lys	Lys	Ser	Pro	Gly	Glu	Arg	Asn	Val	Lys	Phe	Gly	Ala	Arg	Glu	His		
	130					135					140						
Ala	Met	Gly	Ser	Ile	Cys	Asn	Gly	Leu	Ala	Leu	His	Ser	Pro	Gly	Leu		
145					150					155					160		
Leu	Pro	Tyr	Cys	Ala	Thr	Tyr	Phe	Val	Phe	Thr	Asp	Tyr	Met	Arg	Ala		
				165					170					175			
Ala	Met	Arg	Ile	Ser	Ala	Leu	Ser	Lys	Ala	Arg	Val	Leu	Tyr	Ile	Met		
			180					185					190				
Thr	His	Asp	Ser	Ile	Gly	Leu	Gly	Glu	Asp	Gly	Pro	Thr	His	Gln	Pro		
		195					200					205					
Val	Glu	His	Leu	Ala	Ser	Phe	Arg	Ala	Met	Pro	Asn	Ile	Leu	Thr	Leu		
	210					215					220						
Arg	Pro	Ala	Asp	Gly	Asn	Glu	Thr	Ala	Gly	Ala	Tyr	Arg	Ala	Ala	Val		
225					230				235						240		
Gln	Asn	Gly	Glu	Arg	Pro	Ser	Ile	Leu	Val	Leu	Ala	Arg	Gln	Lys	Leu		
				245					250				255				
Pro	Gln	Leu	Pro	Gly	Thr	Ser	Ile	Glu	Gly	Val	Ser	Lys	Gly	Gly	Tyr		
		260						265					270				
Val	Ile	Ser	Asp	Asn	Ser	Arg	Gly	Gly	Asn	Ser	Lys	Pro	Asp	Val	Ile		
		275					280					285					
Leu	Ile	Gly	Thr	Gly	Ser	Glu	Leu	Glu	Ile	Ala	Ala	Arg	Ala	Gly	Asp		
	290					295				300							
Glu	Leu	Arg	Lys	Glu	Gly	Lys	Lys	Val	Arg	Val	Val	Ser	Leu	Val	Cys		
305					310					315					320		
Trp	Glu	Leu	Phe	Ala	Glu	Gln	Ser	Glu	Lys	Tyr	Arg	Glu	Thr	Val	Leu		
				325					330				335				
Pro	Ser	Gly	Val	Thr	Ala	Arg	Val	Ser	Val	Glu	Ala	Gly	Ser	Thr	Phe		
			340					345					350				
Gly	Trp	Glu	Arg	Phe	Ile	Gly	Pro	Lys	Gly	Lys	Ala	Val	Gly	Ile	Asp		
		355					360					365					
Arg	Phe	Gly	Ala	Ser	Ala	Pro	Ala	Glu	Arg	Leu	Phe	Lys	Glu	Phe	Gly		
	370					375					380						
Ile	Thr	Val	Glu	Ala	Val	Val	Ala	Ala	Ala	Lys	Glu	Ile	Cys				
385					390					395							

&lt;210&gt; 7

&lt;211&gt; 402

&lt;212&gt; PRT

&lt;213&gt; Escherichia coli

&lt;400&gt; 7

Glu	Glu	Glu	Val	Ala	Leu	Ala	Arg	Gln	Lys	Leu	Gly	Trp	His	His	Pro	1	5	10	15
Pro	Phe	Glu	Ile	Pro	Lys	Glu	Ile	Tyr	His	Ala	Trp	Asp	Ala	Arg	Glu	20	25	30	
Lys	Gly	Glu	Lys	Ala	Gln	Gln	Ser	Trp	Asn	Glu	Lys	Phe	Ala	Ala	Tyr	35	40	45	
Lys	Lys	Ala	His	Pro	Gln	Leu	Ala	Glu	Glu	Phe	Thr	Arg	Arg	Met	Ser	50	55	60	
Gly	Gly	Leu	Pro	Lys	Asp	Trp	Glu	Lys	Thr	Thr	Gln	Lys	Tyr	Ile	Asn	65	70	75	80
Glu	Leu	Gln	Ala	Asn	Pro	Ala	Lys	Ile	Ala	Thr	Arg	Lys	Ala	Ser	Gln	85	90	95	
Asn	Thr	Leu	Asn	Ala	Tyr	Gly	Pro	Met	Leu	Pro	Glu	Leu	Leu	Gly	Gly	100	105	110	
Ser	Ala	Asp	Leu	Ala	Pro	Ser	Asn	Leu	Thr	Ile	Trp	Lys	Gly	Ser	Val	115	120	125	
Ser	Leu	Lys	Glu	Asp	Pro	Ala	Gly	Asn	Tyr	Ile	His	Tyr	Gly	Val	Arg	130	135	140	
Glu	Phe	Gly	Met	Thr	Ala	Ile	Ala	Asn	Gly	Ile	Ala	His	His	Gly	Gly	145	150	155	160
Phe	Val	Pro	Tyr	Thr	Ala	Thr	Phe	Leu	Met	Phe	Val	Glu	Tyr	Ala	Arg	165	170	175	
Asn	Ala	Ala	Arg	Met	Ala	Ala	Leu	Met	Lys	Ala	Arg	Gln	Ile	Met	Val	180	185	190	
Tyr	Thr	His	Asp	Ser	Ile	Gly	Leu	Gly	Glu	Asp	Gly	Pro	Thr	His	Gln	195	200	205	
Ala	Val	Glu	Gln	Leu	Ala	Ser	Leu	Arg	Leu	Thr	Pro	Asn	Phe	Ser	Thr	210	215	220	
Trp	Arg	Pro	Cys	Asp	Gln	Val	Glu	Ala	Ala	Val	Gly	Trp	Lys	Leu	Ala	225	230	235	240
Val	Glu	Arg	His	Asn	Gly	Pro	Thr	Ala	Leu	Ile	Leu	Ser	Arg	Gln	Asn	245	250	255	
Leu	Ala	Gln	Val	Glu	Arg	Thr	Pro	Asp	Gln	Val	Lys	Glu	Ile	Ala	Arg	260	265	270	

Gly Gly Tyr Val Leu Lys Asp Ser Gly Gly Lys Pro Asp Ile Ile Leu  
 275 280 285  
 Ile Ala Thr Gly Ser Glu Met Glu Ile Thr Leu Gln Ala Ala Glu Lys  
 290 300  
 Leu Ala Gly Glu Gly Arg Asn Val Arg Val Val Ser Leu Pro Ser Thr  
 305 310 315 320  
 Asp Ile Phe Asp Ala Gln Asp Glu Glu Tyr Arg Glu Ser Val Leu Pro  
 325 330 335  
 Ser Asn Val Ala Ala Arg Val Ala Val Glu Ala Gly Ile Ala Asp Tyr  
 340 345 350  
 Trp Tyr Lys Tyr Val Gly Leu Lys Gly Ala Ile Val Gly Met Thr Gly  
 355 360 365  
 Tyr Gly Glu Ser Ala Pro Ala Asp Lys Leu Phe Pro Phe Phe Gly Phe  
 370 375 380  
 Thr Ala Glu Asn Ile Val Ala Lys Ala His Lys Val Leu Gly Val Lys  
 385 390 395 400  
 Gly Ala

<210> 8  
 <211> 400  
 <212> PRT  
 <213> Bacillus subtilis

<400> 8  
 Lys Glu Glu Ser Lys Leu Thr Lys Glu Ala Tyr Ala Trp Thr Tyr Glu  
 1 5 10 15  
 Glu Asp Phe Tyr Val Pro Ser Glu Val Tyr Glu His Phe Ala Val Ala  
 20 25 30  
 Val Lys Glu Ser Gly Glu Lys Lys Glu Gln Glu Trp Asn Ala Gln Phe  
 35 40 45  
 Ala Lys Tyr Lys Glu Val Tyr Pro Glu Leu Ala Glu Gln Leu Glu Leu  
 50 55 60  
 Ala Ile Lys Gly Glu Leu Pro Lys Asp Trp Asp Gln Glu Val Pro Val  
 65 70 75 80  
 Tyr Glu Lys Gly Ser Ser Leu Ala Ser Arg Ala Ser Ser Gly Glu Val  
 85 90 95  
 Leu Asn Gly Leu Ala Lys Lys Ile Pro Phe Phe Val Gly Gly Ser Ala  
 100 105 110  
 Asp Leu Ala Gly Ser Asn Lys Thr Thr Ile Lys Asn Ala Gly Asp Phe  
 115 120 125

Thr Ala Val Asp Tyr Ser Gly Lys Asn Phe Trp Phe Gly Val Arg Glu  
 130 135 140  
 Phe Ala Met Gly Ala Ala Leu Asn Gly Met Ala Leu His Gly Gly Leu  
 145 150 155 160  
 Arg Val Phe Gly Gly Thr Phe Phe Val Phe Ser Asp Tyr Leu Arg Pro  
 165 170 175  
 Ala Ile Arg Leu Ala Ala Leu Met Gly Leu Pro Val Thr Tyr Val Phe  
 180 185 190  
 Thr His Asp Ser Ile Ala Val Gly Glu Asp Gly Pro Thr His Glu Pro  
 195 200 205  
 Val Glu Gln Leu Ala Ser Leu Arg Ala Met Pro Asn Leu Ser Leu Ile  
 210 215 220  
 Arg Pro Ala Asp Gly Asn Glu Thr Ala Ala Ala Trp Lys Leu Ala Val  
 225 230 235 240  
 Gln Ser Thr Asp His Pro Thr Ala Leu Val Leu Thr Arg Gln Asn Leu  
 245 250 255  
 Pro Thr Ile Asp Gln Thr Ser Glu Glu Ala Leu Ala Gly Val Glu Lys  
 260 265 270  
 Gly Ala Tyr Val Val Ser Lys Ser Lys Asn Glu Thr Pro Asp Ala Leu  
 275 280 285  
 Leu Ile Ala Ser Gly Ser Glu Val Gly Leu Ala Ile Glu Ala Gln Ala  
 290 295 300  
 Glu Leu Ala Lys Glu Asn Ile Asp Val Ser Val Val Ser Met Pro Ser  
 305 310 315 320  
 Met Asp Arg Phe Glu Lys Gln Ser Asp Glu Tyr Lys Asn Glu Val Leu  
 325 330 335  
 Pro Ala Asp Val Lys Lys Arg Leu Ala Ile Glu Met Gly Ser Ser Phe  
 340 345 350  
 Gly Trp Gly Lys Tyr Thr Gly Leu Glu Gly Asp Val Leu Gly Ile Asp  
 355 360 365  
 Arg Phe Gly Ala Ser Ala Pro Gly Glu Thr Ile Ile Asn Glu Tyr Gly  
 370 375 380  
 Phe Ser Val Pro Asn Val Val Asn Arg Val Lys Ala Leu Ile Asn Lys  
 385 390 395 400

&lt;210&gt; 9

&lt;211&gt; 391

&lt;212&gt; PRT

&lt;213&gt; Mycoplasma genitalium

&lt;400&gt; 9

Glu	Val	Asp	Phe	Gln	Leu	Phe	Glu	Lys	Arg	Thr	Asn	Thr	Asn	Phe	Asn
1				5					10					15	
Phe	Phe	Asn	Tyr	Pro	Asp	Ser	Ile	Tyr	His	Trp	Phe	Lys	Gln	Thr	Val
			20					25					30		
Ile	Glu	Arg	Gln	Lys	Gln	Ile	Lys	Glu	Asp	Tyr	Asn	Asn	Leu	Leu	Ile
		35					40					45			
Ser	Leu	Lys	Asp	Lys	Pro	Leu	Phe	Lys	Lys	Phe	Thr	Asn	Trp	Ile	Asp
	50					55					60				
Ser	Asp	Phe	Gln	Ala	Leu	Tyr	Leu	Asn	Gln	Leu	Asp	Glu	Lys	Lys	Val
65					70					75					80
Ala	Lys	Lys	Asp	Ser	Ala	Thr	Arg	Asn	Tyr	Leu	Lys	Asp	Phe	Leu	Asn
				85					90					95	
Gln	Ile	Asn	Asn	Pro	Asn	Ser	Asn	Leu	Tyr	Cys	Leu	Asn	Ala	Asp	Val
			100					105					110		
Ser	Arg	Ser	Cys	Phe	Ile	Lys	Ile	Gly	Asp	Asp	Asn	Leu	His	Glu	Asn
		115					120					125			
Pro	Cys	Ser	Arg	Asn	Ile	Gln	Ile	Gly	Ile	Arg	Glu	Phe	Ala	Met	Ala
	130					135					140				
Thr	Ile	Met	Asn	Gly	Met	Ala	Leu	His	Gly	Gly	Ile	Lys	Val	Met	Gly
145					150					155					160
Gly	Thr	Phe	Leu	Ala	Phe	Ala	Asp	Tyr	Ser	Lys	Pro	Ala	Ile	Arg	Leu
				165					170					175	
Gly	Ala	Leu	Met	Asn	Leu	Pro	Val	Phe	Tyr	Val	Tyr	Thr	His	Asp	Ser
			180					185					190		
Tyr	Gln	Val	Gly	Gly	Asp	Gly	Pro	Thr	His	Gln	Pro	Tyr	Asp	Gln	Leu
		195					200					205			
Pro	Met	Leu	Arg	Ala	Ile	Glu	Asn	Val	Cys	Val	Phe	Arg	Pro	Cys	Asp
	210					215					220				
Glu	Lys	Glu	Thr	Cys	Ala	Gly	Phe	Asn	Tyr	Gly	Leu	Leu	Ser	Gln	Asp
225					230					235					240
Gln	Thr	Thr	Val	Leu	Val	Leu	Thr	Arg	Gln	Pro	Leu	Lys	Ser	Ile	Asp
				245					250					255	
Asn	Thr	Asp	Ser	Leu	Lys	Thr	Leu	Lys	Gly	Gly	Tyr	Ile	Leu	Leu	Asp
			260					265					270		
Arg	Lys	Gln	Pro	Asp	Leu	Ile	Ile	Ala	Ala	Ser	Gly	Ser	Glu	Val	Gln
		275					280					285			
Leu	Ala	Ile	Glu	Phe	Glu	Lys	Val	Leu	Thr	Lys	Gln	Asn	Val	Lys	Val
	290					295					300				

Arg Ile Leu Ser Val Pro Asn Ile Thr Leu Leu Leu Lys Gln Asp Glu  
305 310 315 320

Lys Tyr Leu Lys Ser Leu Phe Asp Ala Asn Ser Ser Leu Ile Thr Ile  
325 330 335

Glu Ala Ser Ser Ser Tyr Glu Trp Phe Cys Phe Lys Lys Tyr Val Lys  
340 345 350

Asn His Ala His Leu Gly Ala Phe Ser Phe Gly Glu Ser Asp Asp Gly  
355 360 365

Asp Lys Val Tyr Gln Gln Lys Gly Phe Asn Leu Glu Arg Leu Met Lys  
370 375 380

Ile Phe Thr Ser Leu Arg Asn  
385 390

<210> 10

<211> 316

<212> PRT

<213> Methanococcus jannaschii

<400> 10

Met Val Lys Leu Ser Gly Val Tyr Lys Gly Met Arg Lys Gly Tyr Gly  
1 5 10 15

Glu Thr Leu Ile Glu Leu Gly Lys Lys Tyr Glu Asn Leu Val Val Leu  
20 25 30

Asp Ala Asp Leu Ser Gly Ser Thr Gln Thr Ala Met Phe Ala Lys Glu  
35 40 45

Phe Pro Glu Arg Phe Phe Asn Ala Gly Val Ala Glu Gln Asn Met Ile  
50 55 60

Gly Met Ala Ala Gly Leu Ala Thr Thr Gly Lys Ile Val Phe Ala Ser  
65 70 75 80

Ser Phe Ser Met Phe Ala Ser Gly Arg Ala Trp Glu Ile Ile Arg Asn  
85 90 95

Leu Val Ala Tyr Pro Lys Leu Asn Val Lys Ile Val Ala Thr His Ala  
100 105 110

Gly Ile Thr Val Gly Glu Asp Gly Ala Ser His Gln Met Cys Glu Asp  
115 120 125

Ile Ala Ile Met Arg Ala Ile Pro Asn Met Val Val Ile Ala Pro Thr  
130 135 140

Asp Tyr Tyr His Thr Lys Asn Val Ile Arg Thr Ile Ala Glu Tyr Lys  
145 150 155 160

Gly Pro Val Tyr Val Arg Met Pro Arg Arg Asp Thr Glu Ile Ile Tyr  
165 170 175



Glu Asn Glu Glu Glu Ala Thr Phe Glu Ile Gly Lys Gly Lys Ile Leu  
                     180                    185                    190  
 Val Asp Gly Glu Asp Leu Thr Ile Ile Ala Thr Gly Glu Glu Val Pro  
                     195                    200                    205  
 Glu Ala Leu Arg Ala Gly Glu Ile Leu Lys Glu Asn Gly Ile Ser Ala  
                     210                    215                    220  
 Glu Ile Val Glu Met Ala Thr Ile Lys Pro Ile Asp Glu Glu Ile Ile  
                     225                    230                    235                    240  
 Lys Lys Ser Lys Asp Phe Val Val Thr Val Glu Asp His Ser Ile Ile  
                     245                    250                    255  
 Gly Gly Leu Gly Gly Ala Val Ala Glu Val Ile Ala Ser Asn Gly Leu  
                     260                    265                    270  
 Asn Lys Lys Leu Leu Arg Ile Gly Ile Asn Asp Val Phe Gly Arg Ser  
                     275                    280                    285  
 Gly Lys Ala Asp Glu Leu Leu Lys Tyr Tyr Gly Leu Asp Gly Glu Ser  
                     290                    295                    300  
 Ile Ala Lys Arg Ile Met Glu Glu Met Lys Lys Glu  
                     305                    310                    315

&lt;210&gt; 11

&lt;211&gt; 409

&lt;212&gt; PRT

&lt;213&gt; Bacillus thiaminolyticus

&lt;400&gt; 11

Met Ser Lys Val Lys Gly Phe Ile Tyr Lys Pro Leu Met Val Met Leu  
           1                    5                    10                    15  
 Ala Leu Leu Leu Val Val Val Ser Pro Ala Gly Ala Gly Ala Ala His  
                     20                    25                    30  
 Ser Asp Ala Ser Ser Asp Ile Thr Leu Lys Val Ala Ile Tyr Pro Tyr  
                     35                    40                    45  
 Val Pro Asp Pro Ala Arg Phe Gln Ala Ala Val Leu Asp Gln Trp Gln  
                     50                    55                    60  
 Arg Gln Glu Pro Gly Val Lys Leu Glu Phe Thr Asp Trp Asp Ser Tyr  
                     65                    70                    75                    80  
 Ser Ala Asp Pro Pro Asp Asp Leu Asp Val Phe Val Leu Asp Ser Ile  
                     85                    90                    95  
 Phe Leu Ser His Phe Val Asp Ala Gly Tyr Leu Leu Pro Phe Gly Ser  
                     100                    105                    110  
 Gln Asp Ile Asp Gln Ala Glu Asp Val Leu Pro Phe Ala Leu Gln Gly  
                     115                    120                    125

Ala	Lys	Arg	Asn	Gly	Glu	Val	Tyr	Gly	Leu	Pro	Gln	Ile	Leu	Cys	Thr	130	135	140
Asn	Leu	Leu	Phe	Tyr	Arg	Lys	Gly	Asp	Leu	Lys	Ile	Gly	Gln	Val	Asp	145	150	155
Asn	Ile	Tyr	Glu	Leu	Tyr	Lys	Lys	Ile	Gly	Thr	Ser	His	Ser	Glu	Gln	165	170	175
Ile	Pro	Pro	Pro	Gln	Asn	Lys	Gly	Leu	Leu	Ile	Asn	Met	Ala	Gly	Gly	180	185	190
Thr	Thr	Lys	Ala	Ser	Met	Tyr	Leu	Glu	Ala	Leu	Ile	Asp	Val	Thr	Gly	195	200	205
Gln	Tyr	Thr	Glu	Tyr	Asp	Leu	Leu	Pro	Pro	Leu	Asp	Pro	Leu	Asn	Asp	210	215	220
Lys	Val	Ile	Arg	Gly	Leu	Arg	Leu	Leu	Ile	Asn	Met	Ala	Gly	Glu	Lys	225	230	235
Pro	Ser	Gln	Tyr	Val	Pro	Glu	Asp	Gly	Asp	Ala	Tyr	Val	Arg	Ala	Ser	245	250	255
Trp	Phe	Ala	Gln	Gly	Ser	Gly	Arg	Ala	Phe	Ile	Gly	Tyr	Ser	Glu	Ser	260	265	270
Met	Met	Arg	Met	Gly	Asp	Tyr	Ala	Glu	Gln	Val	Arg	Phe	Lys	Pro	Ile	275	280	285
Ser	Ser	Ser	Ala	Gly	Gln	Asp	Ile	Pro	Leu	Phe	Tyr	Ser	Asp	Val	Val	290	295	300
Ser	Val	Asn	Ser	Lys	Thr	Ala	His	Pro	Glu	Leu	Ala	Lys	Lys	Leu	Ala	305	310	315
Asn	Val	Met	Ala	Ser	Ala	Asp	Thr	Val	Glu	Gln	Ala	Leu	Arg	Pro	Gln	325	330	335
Ala	Asp	Gly	Gln	Tyr	Pro	Gln	Tyr	Leu	Leu	Pro	Ala	Arg	His	Gln	Val	340	345	350
Tyr	Glu	Ala	Leu	Met	Gln	Asp	Tyr	Pro	Ile	Tyr	Ser	Glu	Leu	Ala	Gln	355	360	365
Ile	Val	Asn	Lys	Pro	Ser	Asn	Arg	Val	Phe	Arg	Leu	Gly	Pro	Glu	Val	370	375	380
Arg	Thr	Trp	Leu	Lys	Asp	Ala	Lys	Gln	Val	Leu	Pro	Glu	Ala	Leu	Gly	385	390	395
Leu	Thr	Asp	Val	Ser	Ser	Leu	Ala	Ser								405		

&lt;210&gt; 12

&lt;211&gt; 13

<212> PRT

<213> Naegleria gruberi

<400> 12

Ala Ser Asp Leu Pro Gln Ser Gly Asp Gln Val Asn Lys  
1 5 10

<210> 13

<211> 12

<212> PRT

<213> Naegleria gruberi

<400> 13

Thr Ile Leu Asp Ser Thr Val Val Ala Ser Gln Arg  
1 5 10

<210> 14

<211> 15

<212> PRT

<213> Naegleria gruberi

<400> 14

Ser Ser Asn Phe Tyr Ala Gln Leu Ser Gln Gln Phe Asp Ala Lys  
1 5 10 15

<210> 15

<211> 16

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

<400> 15

Cys Ala Arg Trp Ser Ile Gly Gly His Gly Ala Tyr Cys Ala Arg Gly  
1 5 10 15

<210> 16

<211> 17

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

<400> 16

Thr Thr Ile Gly Cys Arg Thr Cys Arg Ala Ala Tyr Thr Gly Tyr Thr  
1 5 10 15

Gly

<210> 17

<211> 22

<212> DNA  
 <213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

<400> 17

tgtcggatat agtgaaagta'tg

22

<210> 18

<211> 22

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

<400> 18

aaccttttgc ttttcatcac ac

22

<210> 19

<211> 31

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

<400> 19

gagatataca tatgtccact caaccaaaga c

31

<210> 20

<211> 33

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

<400> 20

tatggatcct taaaggaatg gtctcaagac acc

33

<210> 21

<211> 27

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

<400> 21

caataaaaag tttgagctca agtattg

27

<210> 22  
<211> 13  
<212> PRT  
<213> Naegleria gruberi

<400> 22  
Val Tyr Gly Phe Pro Gln Tyr Leu Cys Ser Asn Phe Leu  
1 5 10

<210> 23  
<211> 6  
<212> PRT  
<213> Naegleria gruberi

<400> 23  
Gly Tyr Ser Glu Ser Met  
1 5